

CLAIMS

1 A picture decoding apparatus for decoding a coded stream
including a moving picture stream that has pictures of different sizes,
5 with reference to a decoded picture, the apparatus comprising:

a picture memory including a memory area for holding
decoded pictures;

a memory division unit operable to divide the memory area of
the picture memory into division areas of a predetermined size; and

10 a storage unit operable to sequentially store all data of one
newly decoded picture in sequential memory areas which are formed
with one or more of the division areas of said picture memory.

2 The picture decoding apparatus according to Claim 1,
15 further comprising a size change judgment unit operable to judge
whether or not a picture size has been changed by comparing a
picture size of a newly decoded picture and a picture size of a picture
just decoded before,

wherein in the case where it is judged that the picture size of
20 the newly decoded picture has been changed, said memory division
unit divides the memory area so that the size of the division area
becomes the picture size of the newly decoded picture.

3 The picture decoding apparatus according to Claim 2,
25 wherein said storage unit includes a first free area estimation
unit for estimating whether or not at least one of the division areas
is a free area; and in the case where at least one of the division
areas is estimated as a free area, said storage unit sequentially
stores all the data of the newly decoded picture in the sequential
30 memory area which is one of the estimated division areas.

4. The picture decoding apparatus according to Claim 3,

wherein said storage unit includes a first picture deletion unit operable to generate the free area by sequentially deleting a picture from the one whose display order is the oldest among the decoded pictures which are already held in said picture memory, and in the case where none of the division areas is estimated as a free area, said storage unit has the first picture deletion unit delete the decoded pictures until at least one of the division areas is estimated as a free area.

5 5. The picture decoding apparatus according to Claim 4,
 wherein said storage unit further comprises a display
possibility judgment unit for judging an impossibility of the display
when displaying the decoded picture which is already held in said
picture memory in the case where said decoded picture is deleted
15 before being displayed.

6. The picture decoding apparatus according to Claim 2,
 wherein said storage unit includes a division area selection
unit for sequentially selecting the division area from the head of said
20 picture memory, and said storage unit sequentially stores all the
data of one newly decoded picture in the sequential memory area
which is formed with the selected division areas.

7. The picture decoding apparatus according to Claim 6,
25 wherein said storage unit includes,
 a second free area estimation unit for estimating whether or
not the selected division area is a free area; and
 a second picture deletion unit for making the selected
division area a free area by deleting the decoded picture which is
30 stored in the division area in the case where the selected division
area is not a free area,
 wherein said storage unit sequentially stores all the data of

the newly decoded picture in the sequential memory area which is formed with the selected division areas.

8. The picture decoding apparatus according to Claim 3,
5 wherein said storage unit includes,

a division area selection unit for sequentially selecting the division area from the head of the picture memory in the case where none of the division areas is estimated as a free area;

10 a second free area estimation unit for estimating whether or not the selected division area is a free area; and

a second picture deletion unit for making the selected division area a free area by deleting the decoded picture which is already stored in the division area in the case where the selected division area is not a free area,

15 wherein said storage unit sequentially stores all the data of the newly decoded picture in the sequential memory area which is formed with the selected division areas.

9. The picture decoding apparatus according to Claim 1,
20 further comprising a reading unit operable to read out division information indicating a division method of the memory area from the coded stream,

wherein said memory division unit divides the memory area according to the read division information.

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10. The picture decoding apparatus according to Claim 9,
wherein the division information indicates the biggest picture size among the moving picture streams included in the coded stream, and

30 said memory division unit divides the memory area so that the size of said each division area becomes the picture size indicated by the division information.

11. The picture decoding apparatus according to Claim 9,
wherein the division information indicates the number of the
division areas in the case where the size of the memory area is
divided so that the size of the divided memory area is equal to the
biggest picture size, and

said memory division unit divides the memory area into the
number of the division areas.

12. The picture decoding apparatus according to Claim 9,
wherein the division information indicates the smallest
picture size among the moving picture streams included in the coded
stream, and

said memory division unit divides the memory area so that
the size of said each division area becomes the picture size indicated
by the division information.

13. The picture decoding apparatus according to Claim 9,
wherein the division information indicates the number of the
division areas in the case where the size of the memory area is
divided by the smallest picture size, and

said memory division unit divides the memory area into the
number of the division areas.

14. The picture decoding apparatus according to Claim 9,
wherein the division information indicates the greatest
common divisor of the picture sizes of the moving picture streams
included in the coded stream, and

said memory division unit divides the memory area so that
the size of said each division area becomes the picture size indicated
by the division information.

15. The picture decoding apparatus according to Claim 9,
wherein a value indicated by the division information is
rounded up so that at least the same macroblock is stored within
said same division area.

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16. The picture decoding apparatus according to Claim 9,
wherein a value indicated by the division information is
rounded up so that all the macroblocks of one row in horizontal
direction in said each decoded picture are stored in said one division
area.

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17. The picture decoding apparatus according to Claim 9,
wherein said memory division unit rounds up the size of the
division area so that at least the same macroblock is stored within
said same division area.

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18. The picture decoding apparatus according to Claim 9,
wherein said memory division unit rounds up the size of the
division area so that all the macroblocks equivalent to one row, in
horizontal direction, in said each decoded picture are stored in said
one division area.

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19. The picture decoding apparatus according to Claim 9,
wherein the division information further includes information
indicating whether or not there is a possibility that the decoded
picture already stored in the picture memory may be deleted before
being displayed.

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20. The picture decoding apparatus according to Claim 9,
wherein said storage unit includes the first free area
estimation unit for estimating whether or not at least one of the
division areas within the picture memory is a free area, and

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in the case where a sequential memory area formed with one or more of said division area is estimated as a free area, said storage unit sequentially stores all the data equivalent to said one newly decoded picture in the sequential memory area formed with said estimated division area, said sequential memory area being capable of sequentially holding all the data equivalent to said one newly decoded picture.

21. The picture decoding apparatus according to Claim 20, wherein said storage unit includes the first picture deletion unit operable to generate the free area by sequentially deleting the picture from the one whose display order is the oldest among the decoded pictures stored already in the picture memory, and

in the case where the division area is not estimated as a free area, said storage unit has the first picture deletion unit delete the decoded picture until said division area is estimated as a free area, said division area being capable of sequentially holding all the data of said one newly decoded picture.

22. A picture coding apparatus for generating a coded stream by coding a moving picture stream that includes pictures of different sizes, with reference to coded pictures, the apparatus comprising:

a picture size acquisition unit operable to acquire a picture size of a moving picture stream included in a generated coded stream;

a division information generation unit operable to generate division information indicating a division method of a picture memory on the picture decoding apparatus side, based on the acquired picture size; and

a coding unit operable to generate a coded stream including the generated division information.

23. The picture coding apparatus according to Claim 22,
wherein the division information generation unit generates
the division information indicating the biggest picture size among
the acquired picture sizes.

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24. The picture coding apparatus according to Claim 22,
wherein the division information generation unit generates
the division information indicating the smallest picture size among
the acquired picture sizes.

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25. A picture decoding method for storing a decoded picture in a
picture memory and decoding a coded stream including a moving
picture stream that has pictures of different sizes, with reference to
said decoded picture, comprising:

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a memory division step for dividing the memory area of the
picture memory into division areas of a predetermined size; and
a storage step for sequentially storing all data of one newly
decoded picture in the sequential memory areas which are formed
with one or more division areas of the picture memory.

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26. The picture decoding method according to Claim 25,
further comprising a size change judgment step for judging whether
or not the picture size has been changed by comparing the picture
size of a newly decoded picture and the picture size of a just decoded
picture,

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wherein in the case where it is judged that the picture size of
the newly decoded picture has been changed, the memory division
step divides the memory area so that the size of the division area
becomes the picture size of the newly decoded picture.

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27. The picture decoding method according to Claim 26,
wherein the storage step includes a first free area estimation

step for estimating whether or not at least one of the division areas is a free area; and in the case where at least one of the division areas is estimated as a free area, the storage step sequentially stores all the data of one newly decoded picture in the sequential memory area which is one of the estimated division areas.

28. The picture decoding method according to Claim 27,
wherein the storage step includes a first picture deletion step for generating the free area by sequentially deleting a picture from the one whose display order is the oldest among the decoded pictures which are already stored in the picture memory, and in the case where none of the division areas is estimated as a free area, the storage step has the first picture deletion step delete the decoded pictures until at least one of the division areas is estimated as a free area.

29. The picture decoding method according to Claim 26,
wherein the storage step includes a division area selection step for sequentially selecting the division area from the head of the picture memory, and the storage step sequentially stores all the data of the newly decoded picture in the sequential memory area which is formed with the selected division areas.

30. The picture decoding method according to Claim 29,
wherein the storage step includes,
a second free area estimation step for estimating whether or not the selected division area is a free area; and
a second picture deletion step for making the selected division area a free area by deleting the decoded picture which is stored in the division area in the case where the selected division area is not a free area,
wherein the storage step sequentially stores all the data of

the newly decoded picture in the sequential memory area which is formed with the selected division areas.

31. A picture coding method generating a coded stream by coding
5 a moving picture stream that includes pictures of different sizes, with reference to coded pictures, comprising:

a picture size acquisition step for acquiring a picture size of a moving picture stream included in a generated coded stream;

10 a division information generation step for generating division information indicating a division method of a picture memory on the picture decoding apparatus side, based on the acquired picture size; and

a coding step for generating a coded stream including the generated division information.

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32. A program for a picture decoding apparatus storing decoded pictures in a picture memory and decoding a coded stream including a moving picture stream that has pictures of different sizes, with reference to a decoded picture, having a computer perform following
20 steps:

a memory division step for dividing the memory area of the picture memory into division areas of a predetermined size; and

25 a storage step for sequentially storing all data of one newly decoded picture in the sequential memory areas which are formed with one or more division areas of the picture memory.

33. A program for a picture coding apparatus generating a coded stream by coding a moving picture stream that includes pictures of different sizes, with reference to a coded picture, having a computer
30 perform following steps:

a picture size acquisition step for acquiring a picture size of a moving picture stream included in a generated coded stream;

a division information generation step for generating division information indicating a division method of a picture memory on the picture decoding apparatus side, based on the acquired picture size; and

- 5 a coding step for generating a coded stream including the generated division information.